

IN THE CLAIMS

Claim 1 (Previously Presented): A gateway device connected to a mobile communication network, an external network, and a service control device which executes service control based on signals received from a communication terminal or a predetermined communication device, so as to transmit and receive signals to and from the service control device, the gateway device comprising:

a receiver configured to receive control information, required for providing a plurality of services, from the service control device, the control information including rules or policies defined for each of the plurality of services; and

an information processor configured to perform a predetermined information process for a signal received from the mobile communication network or the external network based on the control information, wherein each rule or policy included in the control information specifies processing for the signal.

Claim 2 (Original): The gateway device according to claim 1,

wherein the information processor comprises a gateway rule retainer and a gateway rule executor,

the gateway rule retainer is configured to retain a gateway rule given through the service control device, and

the gateway rule executor is configured to execute a gateway process by applying the gateway rule to signals, which are received from the service control device, the mobile communication network, the external network, and the communication terminal or the predetermined communication device contained in the mobile communication network or the external network.

Claim 3 (Original): The gateway device according to claim 2,
wherein the gateway rule comprises:

protocol conversion information on protocol conversions which should be executed in the gateway device when packet signals are transferred among the service control device, the mobile communication network, and the external network;

information extraction information on information which should be acquired in the gateway device from the packet signals transmitted from the service control device, the mobile communication device, or the external network;

packet allocation information on packet allocation performed in the gateway device to a connection processor containing a network and the communication terminal or the communication device for the packet signals transmitted from the service control device, the mobile communication network, or the external network; and

information accumulation information on a packet signal which should be accumulated in the gateway device among the packet signals transmitted from the service control device, the mobile communication network, or the external network, and

the gateway rule executor is configured to execute a protocol conversion process in accordance with the protocol conversion information defined by the gateway rule, an information extraction process in accordance with the information extraction information, a packet allocation process to the connection processor in accordance with the packet allocation information, or an accumulation process of the packet signals in accordance with the information accumulation information, for the packet signals received from the service control device, the mobile communication network, the external network, or the communication terminal or the predetermined communication device contained in the mobile communication network or the external network.

Claim 4 (Original): The gateway device according to claim 1,
wherein the information processor comprises a connection path selection rule retainer
and a connection path selection rule executor,
the connection path selection rule retainer is configured to retain a connection path
selection rule given through the service control device, and
the connection path selection rule executor is configured to apply the connection path
selection rule to the signal received from the mobile communication network, the external
network, or the service control device, so as to determine a destination of the signal and to
transfer the signal to the destination.

Claim 5 (Original): The gateway device according to claim 4,
wherein the connection path selection rule comprises:
service type information on service prepared by the service control device or a
contents and service provider in the external network;
source information of packet signals of a service control device, a mobile
communication network, an external network, or a communication terminal or a
predetermined communication device contained in the mobile communication network or the
external network, which are expected in advance to transmit the packet signals; and
destination information of the packet signals which are expected in advance to
designate as the destination of the packet signals by the network or the device, and
the connection path selection rule executor is configured to identify the source
information, the destination information, and the service type information of the packet
signals, to judge the destination of the packet signals by applying the information described
on the connection path selection rule, and to transfer the packet signals to the corresponding
destination, when receiving the packet signals transmitted from the service control device, the

mobile communication network, the external network, or the communication terminal or the predetermined communication device contained in the mobile communication network or the external network.

Claim 6 (Original): The gateway device according to claim 1,
wherein the information processor comprises a screening policy retainer and a screening policy executor,
the screening policy retainer is configured to retain a screening policy sent through the service control device, and
the screening policy executor is configured to apply the screening policy to the packet signals received from the mobile communication network, the external network, or the communication terminal or the predetermined communication device contained in the mobile communication network or the external network, so as to judge the correctness of the signals and to discard an inappropriate packet signal.

Claim 7 (Original): The gateway device according to claim 6,
wherein the screening policy comprises:
information indicating a protocol type which allows transfer of the packet signals, a port number, and a direction the packet signals flow, in the gateway device;
information for judging the correctness of an original protocol defined to mutually connect the service control device, the mobile communication network, and the external network; and
information indicating a limit of packet process capabilities of the service control device and the gateway device, and

the screening policy executor is configured to execute a process for judging the protocol type and the port number of the packet signal and the direction the packet signals flow and for additionally judging the correctness of the original protocol when the packet signal is transmitted on the original protocol; a process for transferring packet signals, which are allowed to be transferred by the screening policy, in the gateway device and for discarding packet signals, which are not allowed to be transferred, in the gateway device, or a process for discarding the packet signal in the gateway device to avoid congestion when the packet signals more than the limit of the process capabilities of the service control device or the gateway device defined by the screening policy are transmitted, when receiving the packet signals transmitted from the mobile communication network, the external network, or the communication terminal or the predetermined communication device contained in the mobile communication network or the external network.

Claim 8 (Original): The gateway device according to claim 1,
wherein the information processor comprises a signal processor, and
the signal processor is configured to perform protocol conversion on the packet signals received from the communication terminal or the predetermined communication device of the mobile communication network into signals usable in the external network for transferring; and to perform protocol conversion on the packet signals received from the communication terminal or the predetermined communication device of the external network into signals usable in the mobile communication network for transferring.

Claim 9 (Previously Presented): The gateway device according to claim 1, further comprising:

a signal converter configured to convert a signal, a destination of the signal being determined in the gateway device to be the service control device, among signals from the mobile communication network, the external network, or the communication terminal or the predetermined communication device contained in the mobile communication network or the external network, from an original protocol into a protocol associated with the service type executed in the service control device, so as to transmit the signal to the service control device, to receive control information and service process results processed in the service control device, and to perform inverse conversion of the signal conversion, the service type including a service providing location information; and

a signal exchanger configured to exchange signals between the signal converter and the mobile communication network or the external network containing the communication terminal or the predetermined communication device.

Claim 10 (Original): The gateway device according to claim 9,

wherein the signal exchanger is configured to define individual service control device interfaces for each of the service types for the service control device, to transfer the signal converted in the signal converter to the service control device through a corresponding service control device interface among the service control device interfaces, to performs, in the signal converter, the inverse conversion on the signal received from the service control device through one of the service control device interfaces, and to transmit the signal to a network, a communication terminal, or a communication device of the service request source.

Claim 11 (Original): The gateway device according to claim 10,
wherein the signal exchanger comprises a service type identifier, and
the service type identifier is configured to define individual network interfaces for each of the service types which the service control device can provide, to receive a service request signal from the mobile communication network, the external network, the communication terminal or the predetermined communication device contained in the mobile communication network or the external network, to exchange the service request signal to the signal converter through the network interfaces corresponding to the service types, and to transmit a received signal, on which the inverse conversion is performed in the signal converter, to the network, the communication terminal or the communication device of the service request source through one of the interfaces.

Claim 12 (Previously Presented): A method of processing a signal in a gateway device connected to a mobile communication network, an external network, and a service control device which executes service based on a signal transmitted from a communication terminal or a predetermined communication device, so as to transmit and receive a signal to and from the service control device, the method comprising:

receiving and retaining a signal defining various rules or policies distributed from the service control device;

determining a service type, from one of a plurality of service types, and a destination requested by a service request signal by the various rules or policies distributed from the service control device for the service request signal received from the mobile communication network or the external network, wherein each rule or policy relates to one of the plurality of service types and specifies processing of the service request signal; and

performing protocol conversion for the service request signal in accordance with a rule or policy corresponding to the service type requested by the service request signal, and transmitting the service request signal to a corresponding destination.

Claim 13 (Original): The gateway device according to claim 1,
wherein the information processor comprises a signal processor and a service type information data retainer,
the service type information data retainer is configured to retain a plurality of service type information data corresponding to each of the services, and
the signal processor is configured to execute a predetermined signal process for the signals, based on information described on the service type information data corresponding to service type information included in the signals received from the service control device, the mobile communication network, the external network, or the communication terminal or the predetermined communication device contained in the mobile communication network or the external network.